## GOALS AND OBJECTIVES

The goal of the Los Angeles County Monitoring Program is to provide technical data and information to support effective watershed stormwater quality management programs in Los Angeles County. Specific objectives of the Program, as outlined in the Municipal Permit, are:

- tracking water quality status, pollutant trends and pollutant loads, and identifying pollutants of concern;
- monitoring and assessing pollutant loads from specific land uses and watershed areas;
- identifying, monitoring, and assessing significant water quality problems related to stormwater discharges within the watershed;
- identifying sources of pollutants in stormwater runoff;
- identifying and eliminating illicit discharges;
- evaluating the effectiveness of management programs, including pollutant reductions achieved by implementation of Best Management Practices; and
- assessing the impacts of stormwater runoff on receiving waters.

The 2000-2001 Monitoring Program was designed to address these objectives through the implementation of three elements: land use station monitoring, mass emission station monitoring, and critical source/BMP monitoring. The County also is addressing illicit discharges through an inspection program.

## LAND USE AND MASS EMISSION STATION MONITORING

### *Stations and Equipment*

Land use stations are defined as relatively small catchments (0.1 to over 5 square miles) that have one predominant land use. The objectives of land use monitoring are to evaluate possible effects of land use on water quality, to evaluate the relative importance of land uses as pollution sources; and to provide data that can be used, along with data from mass emission stations, to project watershed pollutant loads. Data were obtained from seven land use stations during the 2000-2001 storm season: one vacant, one single family high density residential, one multiple family residential, one mixed residential, one light industrial, one transportation, and one educational. Land use stations were equipped with automatic water samplers and stage (water depth) recorders so that flow composite samples could be obtained. Grab samples were not required from land use stations.

In contrast to land use stations, mass emission stations monitor relatively large (100 to 1000 square miles) mixed land use watersheds. Runoff from five mass emissions monitoring stations was sampled during the 2000-2001 storm season. These stations cumulatively represented a total of 1619 square miles of drainage area. The Permit requires mass emission monitoring of four major drainage areas, namely: Ballona Creek, Malibu Creek, Los Angeles River, and San Gabriel River. The purpose of the mass emission monitoring is to support stormwater load estimates and to provide a basis for long term water quality trend analysis. Therefore, the

monitoring stations are located as close as practical to where the creeks and rivers enter the ocean. Mass emission stations are equipped with automated water samplers and stage recorders to collect composite stormwater samples during storm events. Grab samples were also taken at these stations in accordance with the Municipal Permit. Composite samples only were collected from one additional mass emission station (Coyote Creek) to support loadings analyses for the San Gabriel River watershed. At least six storms were sampled at all the mass emission stations during the 2000-2001 storm season, satisfying the required five storm events per station minimum under the 1996 Permit.

### *Hydrologic Conditions and Sampling Success*

Twelve storms were sampled during the season, compared to 13 last season.

### *Water Quality Chemical Analysis*

Monitoring in Los Angeles County in 2000-2001 was performed in compliance with the Municipal Permit issued in July 1996 which requires a broad suite of chemical analyses, including solids, minerals, bacteria, metals, organics, and nutrients. The Los Angeles County Department of Agricultural Commissioner/Weights and Measures, Environmental Toxicology Laboratory provided the water quality laboratory and related services to the Department of Public Works. The laboratory implemented a Quality Assurance/Quality Control program to ensure that the analyses conducted are scientifically valid, defensible, and of known precision and accuracy.

### *Water Quality Results (Mass Emission Study)*

- Malibu Creek had noticeably higher median concentrations of both total and dissolved phosphorus, while the San Gabriel River has the highest median concentration of nitrate.
- The median total dissolved solids concentration in Malibu Creek is more than twice that of any other mass emission site.
- Both total and fecal coliforms exhibited higher medians in the Los Angeles River. Ballona Creek had the greatest range of results for both total and fecal coliforms as well as fecal enterococcus, while the Los Angeles River had the greatest variability for fecal streptococcus results.
- Concentrations were similar among stations for a given metal. In other words, no station appeared to be "cleaner" or "dirtier" than any other with respect to metals.
- There were several individual exceedances of water quality objectives, either of the California Toxics Rule or of the Ocean Plan (or of both), for metals; and in fact, total aluminum, total copper, dissolved copper, and total zinc each had at least one seasonal mean or median exceed an objective.

### *Water Quality Results (Land Use Study)*

- Runoff from the vacant catchment had high pH (8.0) and high alkalinity (median of 180 mg/l), while runoff from the light industrial, transportation, mixed residential, and high

density residential stations had lower median pH values (6.9, 6.8, 6.8, and 6.8 respectively) and lower median alkalinity concentrations (26, 21, 26, and 23 mg/l respectively). The educational and multiple family residential stations fell in between these two extremes with median pH values of 7.1 and 7.3 respectively, and median alkalinities of 31 and 48 mg/l respectively.

- Median hardness concentrations are similar to the alkalinity pattern: high (200 mg/l) at the vacant station; low in the transportation (30 mg/l), mixed residential (40 mg/l), and high density residential stations (20 mg/l); and in between (55, 60, and 75 mg/l) at the educational, light industrial, and multiple family residential stations.
- TSS results overlapped substantially among the different land uses; however, the light industrial station had the highest median for TSS (199 mg/l) being more than twice as high as the next highest median (84 mg/l for transportation).
- Total and dissolved copper concentrations overlapped among the different land uses, however, the dissolved copper median for the transportation station (31.6 µg/l) was more than twice as high as the next highest median (9.0 µg/l for mixed residential). Dissolved copper generally exceeds the 3.1 µg/l California Toxics Rule guideline while both mean and median concentrations of total copper exceed the Ocean Plan guideline in the transportation, light industrial, educational high density single family residential, and mixed residential stations.
- Total lead results are fairly consistent among land uses.
- Dissolved and total zinc exhibit similar patterns; there is substantial overlap among the different land uses although the mean and median for the light industrial station is highest in each case.

### *Water Quality Results (Critical Source/BMP Monitoring Study)*

- Total and dissolved copper medians at the fabricated metal control sites (218 µg/l and 97 µg/l, respectively) were an order of magnitude higher than those at the motor freight sites (3 and 9 µg/l respectively).
- The highest concentrations of total and dissolved lead occurred at the fabricated metal control sites (medians of 109 µg/l and 42 µg/l, respectively) while there were "no meaningful" median values for the motor freight sites.
- The highest dissolved zinc concentration was observed at the auto repair test sites (median of 229 µg/l) as compared with the auto repair control sites (median of 56 µg/l). Total zinc had a median of 299 µg/l at the fabricated metal test sites and a median of 95 µg/l at the auto repair control sites.
- Dissolved nickel had a median of 18 µg/l at the fabricated metal control sites, and the median of dissolved nickel was not meaningful at the motor freight sites.

### *RECOMMENDATIONS*

The Permit states that if a given constituent is not detected in at least 25% of the samples taken in ten consecutive storm events then that constituent may qualify for removal from the analytical suite for the associated station. For both mass emission and land use stations several constituents met this criterion. It is recommended that these constituents be removed from the analytical suite for the associated stations.

The Permit allows the discontinuation of monitoring at a land use station for specific constituents once the event mean concentration (EMC) is derived at the 25% error rate. As mutually agreed upon with the RWQCB, it was decided to use the mean standard error as a substitute for error rate (Swamikannu, 1999). Eighty-nine station-constituent combinations met the criterion and it is recommended that monitoring be discontinued for these constituents at the associated stations.